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POWDER RIVER

TRACT PROFILE
COLSTRIP D TRACT , MONTANA

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

#5479122 ID: 88081485 HD 242.3 .P693A

SITE SPECIFIC ANALYSIS
7. COLSTRIP AREA D

INTRODUCTION

A. PURPOSE AND NEED

The purpose of this analysis is to comply with the Secretary of Interior's decision that a sufficient number of tracts be delineated and selected for sale from the areas designated in land use plans as acceptable for further consideration for leasing to meet the regional leasing target. As a result of the 1979 Powder River Management Framework Plan (MFP) Update, federal coal in this tract was identified for further consideration for development through competitive leasing.

It should be noted that the acreage and legal description of federal coal discussed in this Site Specific Analysis is limited to those areas that have been included in the comprehensive land-use plan, in accordance with Section 3 (A)(e) of the Federal Coal Leasing Amendments Act of 1976, and the decision of the U.S. Secretary of Interior June 2, 1979, that the coal to be selected for sale come "from the areas designated in land-use plans as acceptable for further consideration," (page 60 of Volume I of the Secretarial Issue Document). The coal deposit tonnage listed from the Engineering Report of the U.S. Geological Survey includes areas outside of the BLM planning area.

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I. ALTERNATIVES, INCLUDING THE PROPOSED ACTION

A. NO ACTION ALTERNATIVE

Under the no action alternative, federal coal would not be leased. Because of the "checkerboard" ownership patterns, development would not occur on this tract. Approximately 98 million tons of coal, recoverable by existing methods, would not be mined. It should be noted that mining of fee coal and existing leases will continue to take place in the nearby area with attendant growth and development to occur.

B. PROPOSED ACTION

The proposed action is to offer for lease 2,030 acres of federal coal within a 4,841-acre tract of land in Rosebud County, containing 98 million tons of recoverable coal. The tract comprises an area identified as an economical mining unit for development of a 30-year strip mining operation. The tract is located one to two miles north and east of Colstrip and about two miles east of State Highway 315. See Map 1 for location and legal description.

Part of an existing mine

The mining operation would have an annual production of 3.4 million tons out of the 19.1 million tons of Western Energy Co. production in the area and would involve the movement of employees from other areas of the Colstrip mine complex. The tract is composed of 44.1 million tons of federal coal, 53.9 million tons of fee (private) coal and surface disturbance will be approximately 74 acres a year beginning in 1984. Total disturbed area will be 2,213 acres from mining. Facilities and haul roads are in place.

For more specific information on the proposed mining operation, refer to the Engineering Report prepared by the U.S. Geological Survey.

The proposed action assumes that proper mining and reclamation will be carried out according to existing state and federal regulations. These include: Office of Surface Mining Reclamation and Enforcement (OSM) regulations (30 CFR 700-899), Environmental Protection Agency (EPA) regulations (40 CFR 0-1399), Department of the Interior's coal management program regulations (43 CFR 23 and 3400 and 30 CFR 211), and regulations of the Montana Department of State Lands.

Tract Delineation Report Summary

Tract Name: Colstrip D State: Montana

The Colstrip D tract is located in the center of the northern Powder River Basin, Rosebud County, Montana. The tract contains two recoverable coal beds, the Rosebud and McKay, which are present in multiple seams.

The coal deposit occurs in the top part of the Fort Union Formation (Paleocene), which comprises approximately 3,000 feet of sandstones, shales, siltstones, and coal seams. The formation occurs in nearly flat-lying beds. The coal is subbituminous in rank and weighs 1,770 tons per acre-foot. There are no known geologic hazards to surface mining in the Colstrip D tract. See the tract profile summary for the salient geologic data for the tract.

The generic mining plan calls for a surface mine using draglines, electric shovels, dump trucks, loaders, scrapers, and other support equipment. The coal would thus be mined to a depth of 200 feet or until the limiting stripping ratio (6:1) has been reached. The plan indicates that the coal would be shipped by railroad to an electrical utility out of the Powder River Region.

Tract Profile Summary

Colstrip D

Coal Data	Proposed Action
Total Reserves (Million Tons Strippable)	49
Recoverable Reserves (Million Tons)	federal 44 (total 98)
Average Coal Thickness (Ft.)	30
Average Overburden (Ft.)	80
Coal Rank	subbituminous
Percent Recovery	90
Proximate Coal Analysis	
Percent Moisture	23.8
Percent Ash	9.1
Percent Sulfur	0.8
BTUs Per Pound	8,680
Mine Life (Years)	30
Annual Production Rate (Million Tons)	3.4
Tract Area (Acres)	2,030
Surface Mine/Truck Shovel Operation	
Employment	
Construction	No additional
Mine Operation	No additional
Environmental Data	
Water Requirements	62 acre-feet/year.
Transportation, Land Use, VRM, Vegetation	Moderate during mining; low after mining.
Soils	High to moderate.
Reclamation	Low, if successful.
Wildlife	Moderate loss of habitat.
Noise, Air Quality	High during mining, low after successful reclamation.
Agriculture	Moderate during mining; low after successful reclamation.

TRACT PROFILE INTRODUCTION

Background

In July 1979, the BLM, Miles City District Office completed the Powder River Resource Area update for portions of Powder River, Custer, Big Horn, Treasure and Rosebud counties. The land use planning process included applying unsuitability criteria, multiple-use conflict evaluation, and surface owner consultations. As a result of that work, areas were identified that could be further considered for coal development. The areas are available for consideration for new competitive leasing, leasing by exchanging and modifying existing leases.

Following land-use planning the BLM requested expression of interest which, along with other information, guided the GS in delineating this tract. Results of that work are summarized in this profile.

Personnel from BLM, Miles City District inventoried the tract to determine the site specific resource values and then analyzed potential environmental effects of coal development on this individual tract. Among other items, the unsuitability criteria (43 CFR 3461) were reconsidered on this site-specific basis. Any new findings of unsuitability are reflected in the delineation and development proposal of the tract described in this profile.

To be further considered for new competitive leasing, the tract will be presented to the Regional Coal Team who guides and reviews tract ranking and selection and sale scheduling procedures that develop alternatives which would be analyzed in a regional environmental impact statement (EIS). The EIS would analyze the site-specific and regional cumulative effects of coal leasing and development. Alternatives addressed in the EIS would include different combinations of tracts that meet a regional coal leasing target. The analysis of those groups of tracts would result in different impacts than the assessment made in this document for this specific tract. During the process this preliminary tract could be modified. Ultimately, the Secretary will select specific tracts for lease sale. If the tract is leased, the lessee would be required to submit a plan for mining and reclamation (M&R) to the Secretary of Interior, Office of Surface Mining (OSM) for review and approval within 3 years after leasing. Once a mining plan has been submitted, OSM would review the proposed developments of the mining plan. OSM would prepare a site-specific environmental assessment or EIS prior to approval of the mine plan.

Development of the tract is in accordance with the federal coal management program adopted by the Secretary, Department of the Interior, in June 1979. Basis of the program was, in part, the Final Environmental Statement for the Federal Coal Management Program. Implementation procedures are contained in Title 43 - Code of Federal Regulations - Part 3400 (43 CFR 3400). Authorizing actions are The Mineral Leasing Act of 1920, as amended; The Mineral Leasing Act for Acquired Lands of 1947, as amended; the Federal Land Policy and Management Act of 1976; the Surface Mining Control and Reclamation Act of 1977; the Multiple Mineral Development Act of 1954; the Department of Energy Organization Act of 1977; the National Environmental Policy Act of 1969; the Federal Coal Leasing Amendments Act of 1976, as amended; the Act of October 30, 1978, and Federal Regulations concerning federal coal leasing and development including 43 CFR 3400; 30 CFR 211; and 30 CFR 700-899.

In adopting the coal program, the Secretary established a tentative competitive coal leasing target of 776 million tons for 1982 in the Powder River Region of Wyoming and Montana. Subsequent sales would then follow on a 2 to 4 year cycle.

Purpose and Need for Action

Purpose of the action is to offer strippable federal coal reserves that can be further considered for coal leasing and development to help meet the energy needs of the nation.

This tract profile contains a summary of the tract delineation report and a site-specific analysis (SSA). The United States Department of the Interior, Geological Survey (GS) delineated the tract while the Bureau of Land Management (BLM) completed the site-specific environmental inventory and preliminary analysis.

Figure 1.2-1

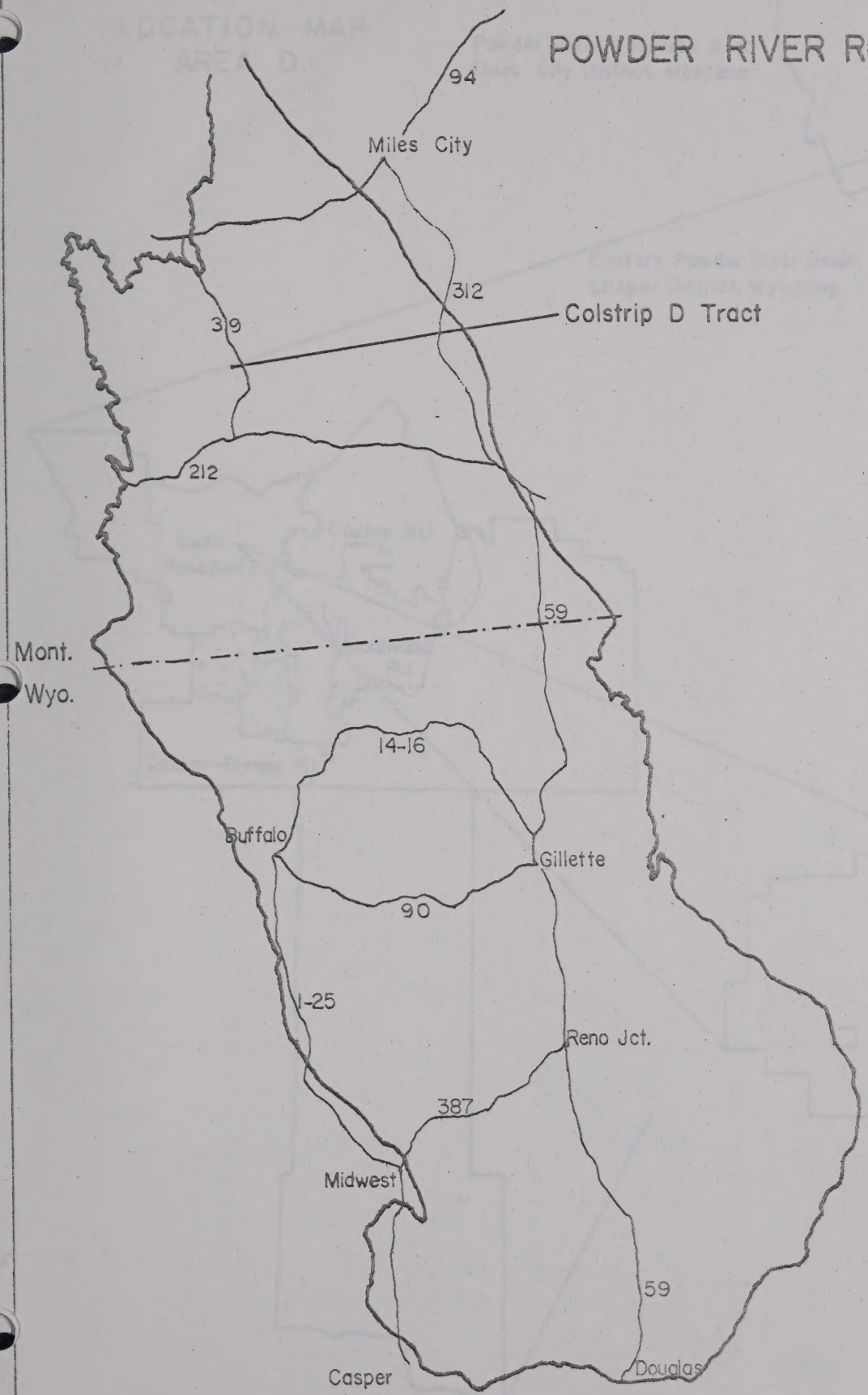
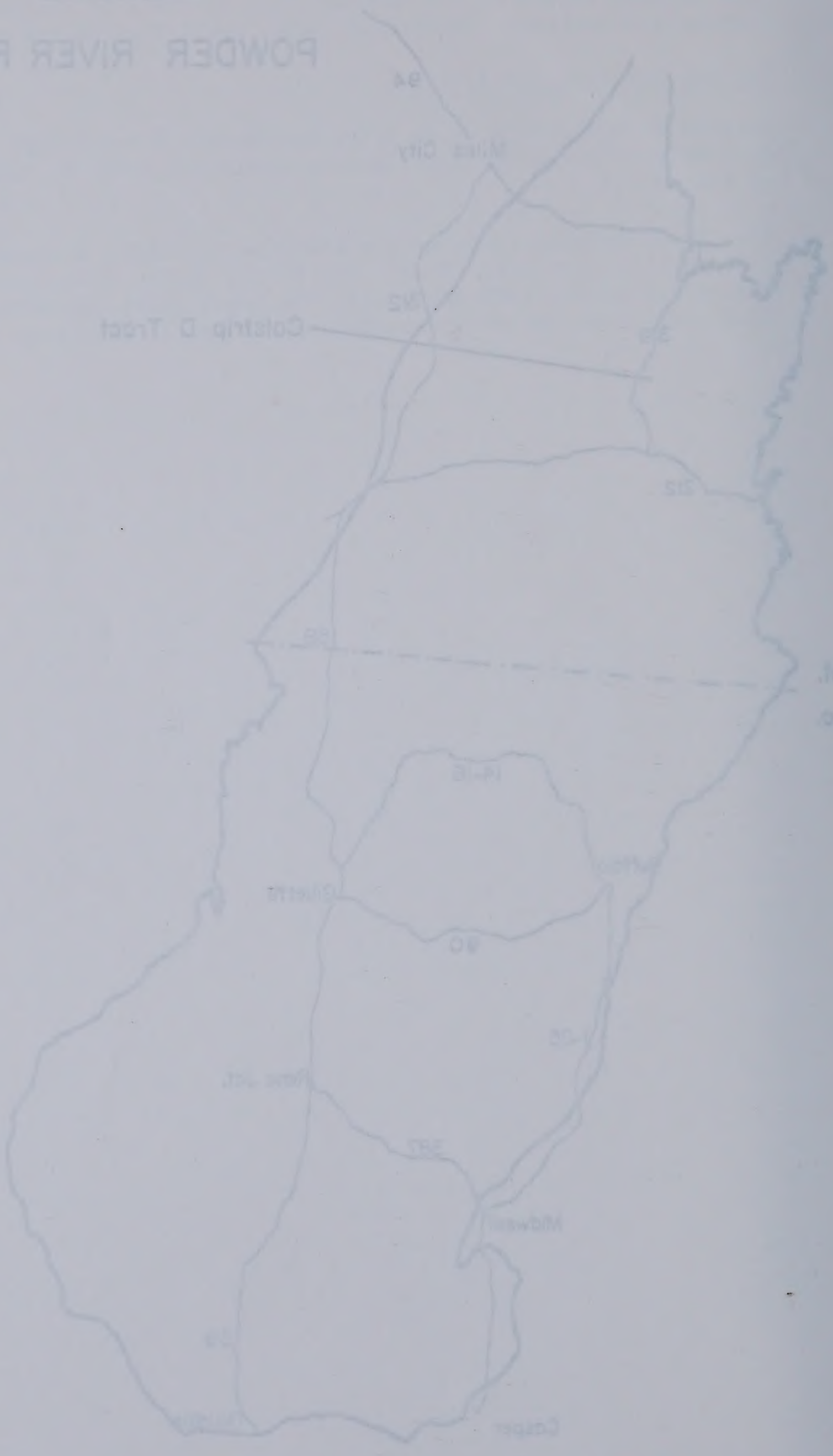
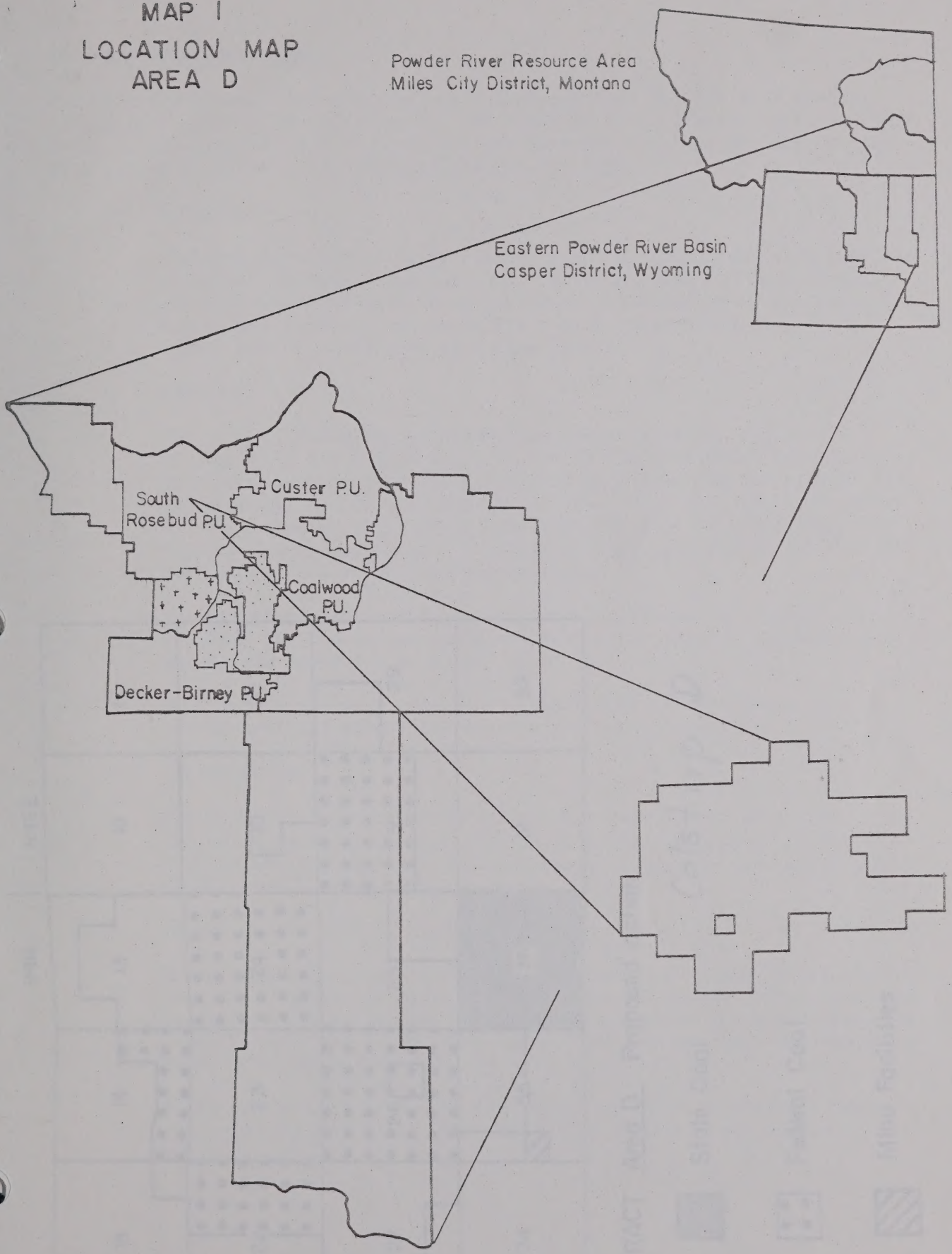
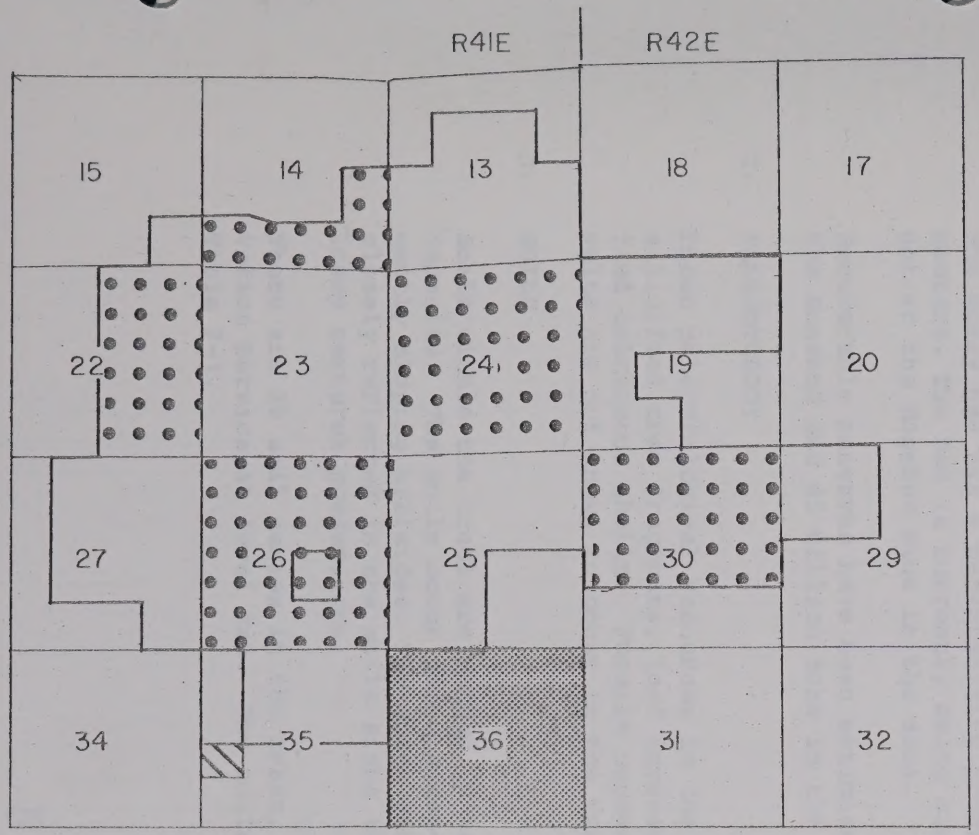


FIGURE 1.2-1



MAP I
LOCATION MAP
AREA D





TRACT Area D Proposed action

Colstrip D

State Coal

Federal Coal

Mine Facilities

II. AFFECTED ENVIRONMENT

The environment that currently exists and changes anticipated from ongoing trends are included in this section. Information is presented within the time frame of the proposed action including the alternatives, and is restricted to that information required to assess significant impacts.

A. TOPOGRAPHY

The tract is located on an upland ridge. Surface expression consists of gently rolling hills and long, narrow divides with occasional, steeply-dissected coulees. Drainage is accomplished in all directions by a branching or dendritic system. Elevations range from 3,220 feet to 3,560 feet above sea level.

B. GEOLOGY

The area is underlain by sandstone, shale, clinker, and coal belonging to the Tongue River Member of the Fort Union Formation (Paleocene). Coal beds of interest in this area are the Rosebud and McKay seams. The Rosebud bed varies from 10 to 24 feet in thickness and is generally overlain by less than 150 feet of overburden. The McKay bed averages about 7 1/2 feet in thickness and varies from 30 feet to 80 feet below the Rosebud seam.

The McKay bed has a marketability problem because of a high sulfur content. The bed is currently being mined at the Big Sky Mine, but not at the Rosebud mine in the area.

Recoverable reserves have been estimated at 102.7 million tons in the Rosebud and 45 million tons in the McKay beds.

C. PALEONTOLOGY

Known paleontological resources in the area consist of poorly silicified tree fragments, leaf impressions, and pieces of unidentified calcareous shells. Fossils possessing exceptional scientific value are not known to occur in the tract.

D. SOILS

Soils within the tract are formed in sandstone, shale and alluvial deposits. The soils occur along steep-sided ridges, footslopes, and gently sloping hillsides. The underlying bedrock characteristics are closely reflected in the soils since they are not well-developed and loamy textures predominate.

There are 29 soil series in the tract, surveyed by the Soil Conservation Service at level two. The soils discussed are listed in Table 7-1.

COLSTRIP D SOIL EROSION
TABLE 7-1

Soil Mapping Unit Name	Depth 1/ Shallow 0-20"	Moderately Deep 20-36"	Deep 36+"	Percent Slope	Soil Erosion Potential 1/ Wind	Water	Surface Acres	Percent of Area	Soil Reconst. Potential 2/	Soil Hazard Conditions	Suitability of Soil Material for Plant Growth (Acre Feet) 3/ Good	Fair	Poor
Armells-Decoigne-Cabbart complex	X (.35)		X (.70)	25-70	Low	High	11	41	Poor	Excess lime, stoniness	4	10	38
Armells-Kirby-Cabbart complex; Birney-Kirby-Cabbart complex	X (.35)		X (.70)	25-70	Low	High	648	13	Poor	Stoniness	43	552	2459
Birney-Cabbart complex; Kirby-Cabbart-Rock outcrop complex	X (.40)		X (.60)	25-70	Low	High	105	2	Poor	Excess lime, stoniness	5	67	369
Birney-Cowers-Kirby complex			X	2-15	Low	Mod.	126	3	Poor	Stoniness	64	98	460
Birney-Kirby channery loams, moist; Birney-Kirby channery loams			X	15-70	Low	High	212	4	Poor	Stoniness	112	123	823
Birney-Kirby-Cabbart complex	X (.25)		X (.75)	15-25	Low	High	85	2	Poor	Stoniness	26	67	311
Busby fine sandy loam; Spang sandy loam			X	2-8	High	Low	453	9	Good	—	1784	—	481
Busby-Blackhall fine sandy loams	X (.30)		X (.70)	2-8	High	Mod.	45	1	Good	—	124	14	38
Busby-Blackhall fine sandy loams	X (.30)		X (.70)	8-25	High	High	425	9	Good	—	1109	132	353
Cabbart-Yawdim-Rock outcrop complex	X			15-70	Low	High	339	7	Poor	Excess lime	17	315	841
Campeth-Cabbart silt loams	X (.35)		X (.65)	4-15	Low	High	23	1	Poor	Excess lime	7	20	88

1/ Soil Depth Classification and Soil Erosion Potential is derived from the S.C.S. Soil Series Descriptions and Interpretations for Rosebud County.

2/ Soil Reconstruction Potential is derived from the National Soils Handbook.

3/ Depth (in acre feet) of available soil calculated from acres x acre feet/acre = Suitability of soil material for plant growth.

Soil Mapping Unit Name	Depth 1/ Shallow 0-20"	Moderately Deep 20-36"	Deep 36+"	Percent Slope	Soil Erosion Potential 1/ Wind	Water	Surface Acres	Percent of Area	Soil Reconst. Potential 2/	Soil Hazard Conditions	3/ Suitability of Soil Material for Plant Growth (Acre Feet) Good	Fair	Poor
Cambeth-Cabbart Complex;	X(.40)		X(.60)	8-25	Low	High	310	6	Poor	Excess lime	96	290	1105
Delpoint-Cabbart loams;													
Yamac-Cabbart loams													
Camborthids Torrifluvents			X	0-8	Mod.	Mod.	3	21	Fair	Too clayey	2	8	6
association, channeled													
Covers-Yamac loam;			X	2-8	Mod.	Mod.	197	4	Poor	Excess lime	134	101	750
Kremlin loam													
Delpoint-Cabbart loams;	X(.40)		X(.60)	8-70	Mod.	High	792	16	Poor	Excess lime	195	1012	1864
Delpoint-Cabbart-Yamac													
loams													
Spang-Bainey Complex			X	8-15	Mod.	Mod.	46	1	Poor	Stoniness	938	22	114
Spang-Covers-Bainey Complex			X	15-25	Mod.	High	3	21	Poor	Excess lime, stoniness	6	2	7
Ustic, Torriorthents, loamy			X	4-15	Mod.	High	224	5	—	* Too variable to rate	—	—	—
Yamac loam			X	2-8	Low	Mod.	133	3	Poor	Excess lime	122	166	376
Yamac-Busby Complex			X	8-15	Mod.	High	292	6	Poor	Excess lime, too sandy	593	201	613
Yamac-Delpoint loams			X	4-15	Low	High	369	8	Poor	Excess lime	229	443	845
TOTALS							4841	100			5610	3643	11941

Soil Depth

Shallow- 18%

Deep- 82%

Soil Erosion Potential

Wind

Low- 52%

Moderate- 28%

High- 20%

Water

Low- 16%

Moderate- 12%

High- 78%

Soil Reconstruction Potential

Good- 19%

Poor- 76%

* 5% too variable to rate

Suitability of Soil Material for Plant Growth

Good- 24%

Fair- 16%

Poor- 52%

Unsuitable- 8%

E. WATER RESOURCES

1. Ground Water

The Rosebud coal in the tract is dry or only partially saturated. Ground water in it flows at about 125 cubic feet per day (cu ft/day) and is generally toward the south (Van Voast et al 1977). One stock and one household well are in use in the tract. Ground water quality for the tract is unknown, but medium total dissolved solids (TDS) concentration in the Colstrip area is 1,700 milligrams per liter (mg/L).

2. Surface Water

No major creeks flow through the tract. The tract is drained by Spring, Pony, Cow and East Fork Armell's Creeks. Sediment yields for the Colstrip area average 0.5 acre feet per square mile per year (ac ft/sq mi/yr) (USGS 1979b).

3. Alluvial Valley Floors and Flood Plains

No flood plains or alluvial valley floors (AVF's) were defined to be in or near the tract.

F. VEGETATION

The Colstrip Area D Economical Mining Unit (EMU) is made up of one major vegetative rangeland type (Payne 1973), which is the ponderosa pine savannah (see Regional paper, unpublished manuscript in Miles City District Office of BLM). The area included in the vegetative type consists of : (a) grassland - 1,965 acres, (b) sagebrush-grassland - 146 acres, (c) ponderosa pine - 2,332 acres, (d) Other - 398 acres. Within this vegetative type, there are varying range sites with varying production yields (pounds per acre) and condition classifications. There are approximately 92 AUMs being produced per year on the tract.

G. LAND RESOURCES

1. Agriculture

Agriculture operations in this area are mainly livestock, hay (alfalfa or grass-legume) and some small grains, mainly winter wheat. The bottomlands are flood-irrigated during spring runoff then sub-irrigated for the balance of the growing season. The water in Armell's Creek is too high in salts and alkalinity for irrigation the rest of the growing season. Alfalfa, grass-legume hay or small grains (oats or barley) are crops raised to feed the livestock in the winter months. Winter wheat is raised to sell. Approximately 3.6 percent of the tract (174 acres), which is Class III and IV land, is currently being used as cropland. In addition, there are approximately 1,119 acres

of Class III and IV privately-owned land (23.12 percent of the tract) that are suitable for cropping, but not presently cropped. There are also 199 acres (4.1 percent of the tract) of Class IV land that have been previously mined and have been reclaimed and seeded to pasture, which could support 139 AUMs.

Approximately 1,116 acres could produce approximately 889 tons of alfalfa and support 558 AUMs or produce 30,495 bushels of winter wheat per year and have 3 acres suitable for tame pasture, which could provide 2 AUMs.

Rosebud County, Montana, owns about 268 acres of Class III and IV land (5.5 percent of the tract) that are suitable for cropland, but not presently cropped. This land could produce 268 tons of alfalfa and support 134 AUMs or produce 7,508 bushels of winter wheat. There are also 25 acres (0.5 percent of the tract) of Class IV land that have been previously mined, reclaimed, and seeded to pasture which could support 18 AUMs.

2. Recreation

The area is relatively isolated from recreational use or demand. There is no recreational development in or near the area. Some very limited hunting use may occur, but any other recreation activity is unlikely. Use of the tract for recreation would require landowner permission. This restriction effectively prohibits use of the area. The area contains no wilderness potential.

3. Other Land Uses

The land within the tract is presently used for ranching. There are no industrial activities and the only other use of the tract is for a small portion occupied by a county road. Existing roads are gravel and receive low use and maintenance. Rail service currently exists to the nearby operating mines and is available.

H. WILDLIFE AND FISHERIES

The Colstrip Area D tract is characterized as a ponderosa pine savannah with some areas of open grassland. Dominant shrubs found in the area are big sagebrush (Artemisia tridentata) and skunkbrush (Rhus trilobata). This vegetative mosaic provides habitat for a wide variety of wildlife.

One sharp-tailed grouse arena occurs in the EMU over federal minerals. A second arena is located adjacent to the EMU over private minerals. No areas were excluded by the unsuitability criteria. Attendance at these two arenas was 12.6 and 10.8 males, respectively, for the past seven years, while average attendance at all arenas in a 160-square-mile area was 13.1 males for the same time frame. Relative density for the EMU is 0.13 arenas/sq mi.

Mule deer use of the area appears to be light with summer densities of no more than 0.5 deer/sq mi. Winter use by 14 deer was observed during the severe winter of 1978-79.

No antelope use has been observed in the EMU, although a wintering area is suspected to occur two miles down Spring Creek from the area.

One active prairie falcon nest has been observed on the sandstone outcrop known as Eagle Rock. This nest site is less than a quarter mile from the EMU boundary and straddles a section line between private and federal mineral ownership. No unsuitability exclusion was made for this nest as it was initially thought to be in a relatively secure area. This determination may have to be reevaluated, based on future mine plan submittals, should the area be leased.

The bald eagle has been observed as a migrant in the Colstrip vicinity and the golden eagle does nest around Colstrip. No activity has been observed in the EMU. There are no other threatened or endangered species known to occur in the area.

State of Montana species of special interest or concern possibly found in the EMU are the Swainson's hawk, upland sandpiper, mountain bluebird, clay-colored sparrow, Brewer's sparrow and plains hognose snake.

I. CULTURAL RESOURCES

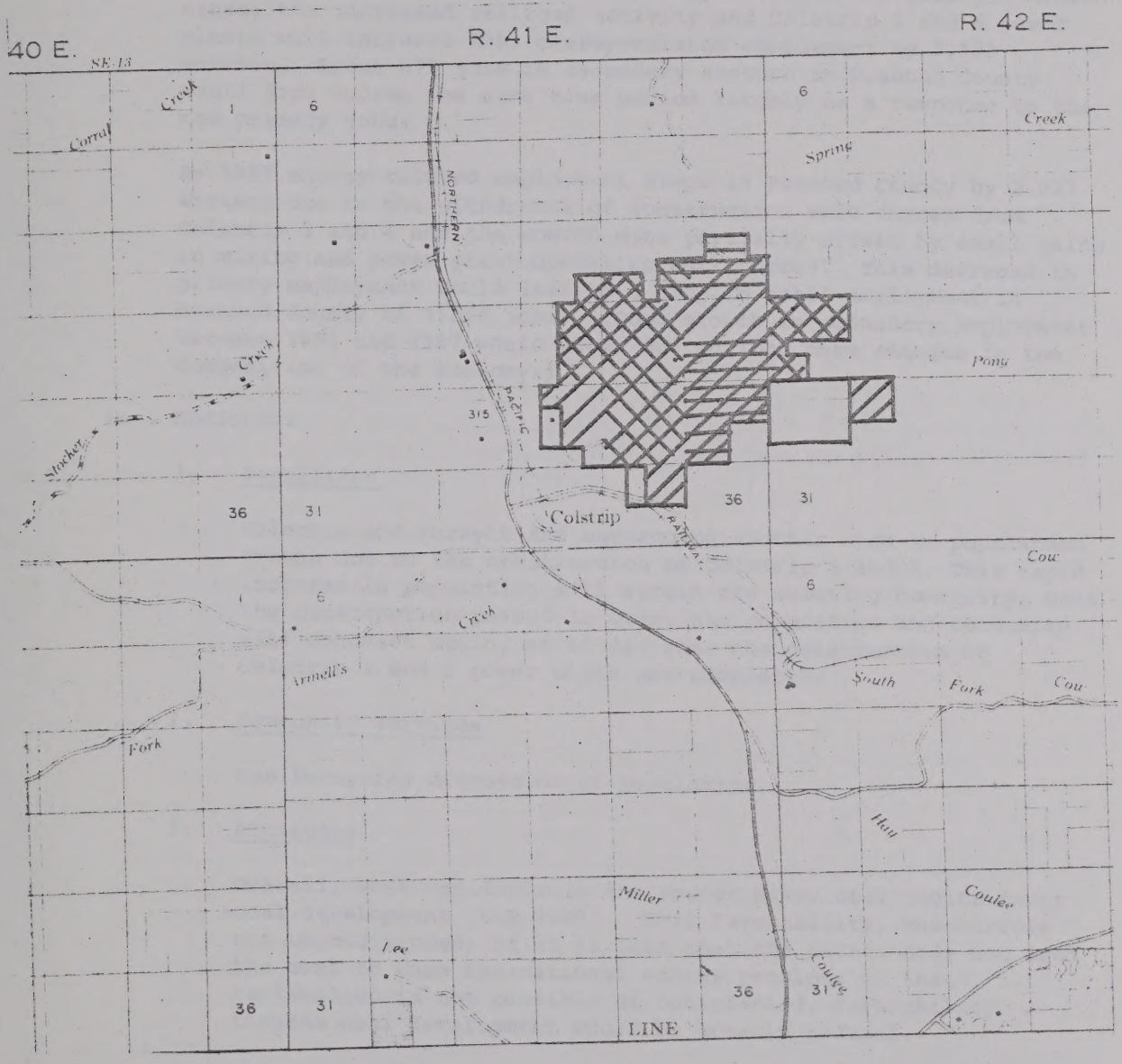
Within the Colstrip Area D tract, 4,070 acres, including 72% of the surface over federal coal, has been inventoried at low intensity in three surveys contracted by industry (Fredlund and Fredlund 1974; L. Fredlund, personal communication 1980) and USGS (Lahren 1977). (See Map 2.) The surveys identified 32 prehistoric lithic scatters and two historic homesteads. The eligibility of the sites for the National Register is undetermined at this time due to the lack of sufficient field information to judge their significance.

Present impacts to cultural resources derive principally from rodent activity, erosion, grazing activity and vandalism. Projected mean site density at 99% confidence is 4.88 ± 2.33 sites per square mile; however, this is based on surveys conducted at reconnaissance intensity rather than total surface coverage intensity, and may be a low estimate. There is a 10% probability of locating additional National Register eligible sites, based on present information.

J. VISUAL RESOURCE MANAGEMENT

The tract is located in an area presently being strip-mined and also used for ranching. Current intrusions are those activities associated with the active mines, with minimal effects from ranching operations. Because of the industrial nature, scenic quality is fairly low and dominated by the existing mines and associated facilities. The view principally consists of rolling terrain and is categorized as classes B and C in scenic quality because of nearly equal amounts of common and unique physiographic and vegetative characteristics.

MAP 2
CULTURAL SURVEY CONDUCTED ON TRACT



Fredlund & Fredlund (1974)

Mineral Research Center (1977)
(unpubl.)

Lahren (1977)

K. ECONOMICS

Present employment in the affected areas of Colstrip and Forsyth in Rosebud County and Broadus in Powder River County is approximately 1883 energy workers. New workers, including both construction and operational employees at Western Energy Co., Peabody Coal and MONTCO mines, the increased railroad activity and Colstrip 3 and 4 power plants will increase 1983 energy-related employment by 2,152 workers. About 679 jobs in secondary sectors in Rosebud County would form during the same time period largely as a response to the new primary jobs.

By 1987 energy-related employment drops in Rosebud County by 2,027 workers due to the withdrawal of construction work forces from Colstrip 3 and 4 and the MONTCO mine partially offset by small gains in mining and power plant operating work forces. This decrease in primary employment would lead to a drop in total employment in Rosebud County of 1,360 jobs. (Some growth in secondary employment between 1983 and 1987 would occur due to long term changes in the composition of the economy.)

L. SOCIOLOGY

1. Population

Colstrip and Forsyth are undergoing another boom in population growth due to the construction of Colstrip 3 and 4. This rapid increase in population will strain the existing community. Once the construction period is over, the population and community will contract again, as it did when the construction of Colstrip 1 and 2 power units was completed.

2. Community Services

See foregoing discussion of population.

3. Attitudes

Overall, most residents in the Powder River coal region favor coal development (BLM 1980). This favorability, however, is not unconditioned; if it is felt that the nation does not need the coal to ease the national energy problems or that reclamation is not possible or not planned, favorability towards coal development would be greatly reduced.

Also associated with attitudes towards coal development are desires to see some controls on development. The controls are of two types: environmental and governmental. Environmental controls are centered around reclamation and concern for water supply and quality. The governmental controls are unspecified, but a strong feeling exists that some level or levels of government should exercise some controlling authority over development. Stated in another way, it is felt that mining companies should not have a free hand in the development of coal. With respect to whether people were more concerned with envi-

ronmental or social impacts, the responses were evenly split. A breakdown of attitudes toward coal development by agricultural-nonagricultural respondents is not available at this time. However, it will be included in the EIS.

M. NOISE

Noises are of an artificial origin due to the use of heavy machinery and explosives in the area.

N. CLIMATE AND AIR QUALITY

The semiarid climate of the study area is characteristic of the continental steppes of the Northern Great Plains, in which the warmest months are the driest. The area has cool moist springs, warm dry summers, and cold moist winters. There are large periodic variations in annual and seasonal precipitation and temperature. The last 10 years have had generally optimum moisture and mild temperatures, but droughts can be expected to recur.

Precipitation in the area varies with elevation and with season. Mean annual precipitation is about 12 inches at low elevations, about 15 to 16 inches at high elevations. Mean annual precipitation at Colstrip is about 15 inches.

Mean annual temperature and seasonal patterns in temperatures are similar throughout the area. Mean annual temperature is about 45°F. Temperatures are lowest in January, averaging about 8°F, and highest in July, averaging about 90°F. High mid-summer temperatures terminate the effective growing season. Relative humidity is lowest in July and highest in winter. The freeze-free season is about 115 days near Colstrip.

Upper winds are generally from the west. Mean seasonal wind speeds range from 12-23 miles per hour at 10,000 feet and 23-35 miles per hour at 18,000 feet. Fall and winter winds are fastest and tend to blow from the northwest, spring winds blow from the west and summer winds from the southwest. These patterns reflect the predominance of weather systems from the cold polar and Arctic regions in late fall and winter, the Pacific Ocean in the spring, and the Gulf of Mexico in the summer (Northern Great Plains Resources Program 1974). Surface wind annual mean speeds in the Colstrip area are about 11 miles per hour. Mean seasonal wind speeds appear to peak in the spring.

Data from the meteorological tower at Colstrip indicate that inversions are very frequent. Inversions occur every month of the year but are prolonged in the winter and broken up in the morning during spring and summer. Inversions are most likely to break up between 8 a.m. and 3 p.m. at Colstrip. Inversion break-up would be most likely to bring high concentrations of pollutants to the ground in winter, when top heights of inversions are lowest. However, early morning (4-5 a.m.) inversions are more frequent in spring, and inversion break-ups occur almost every morning around 8 a.m. Spring afternoon mixing heights vary considerably, suggesting the turbulence of the atmosphere during this season.

CHAPTER III ENVIRONMENTAL CONSEQUENCES

This section describes the significant environmental effects that would occur with implementation of the proposed action including the alternatives. Such items as threatened and endangered plant and animal species, floodplains and wetlands, and wilderness values have been considered and are discussed as appropriate. Also, negative declarations included in the matrices are not presented within the impact discussion in this section. Principal basis for the analysis is the professional judgments of the resource specialists, public and other agency input, and related works, as referenced.

I. NO ACTION ALTERNATIVE

The no action alternative would result in no disruption of the natural land surface.

Under the no action alternative 98 million tons of federal coal and 31.5 million tons of non-federal coal would be bypassed. The yearly federal royalty foregone would be $4,088,000[1/] (at 3.27 million tons per year). The severance tax (state tax flow) foregone would be $9,504,000[1/] per year (at 4.32 million tons annual production). The gross proceeds (revenue to the county and school districts) foregone would be $1,002,000[1/] per year (at an effective tax rate of 23.2¢/ton taxable value ($3.20 ton) times mill levy of .06955).

Under the no action alternative, the paleontological resource would remain undisturbed. However, the potential for exposure and study of unearthed fossils would be lost.

If mining does not occur, none of the impacts related to this tract will be experienced.

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[1] All values are in 1977 dollars.

II. PROPOSED ACTION

A. TOPOGRAPHY

The natural variety of landforms now displayed within the area would be reduced by mining. Slopes, out of necessity to abate erosion, would be reduced. Changing or altering the natural erosional patterns will increase the rates of the area's sediment yield until such time that natural vegetation can be reestablished.

B. GEOLOGY

The major impact of the proposed action would be the removal of about 98 million tons of coal from the Rosebud bed. The McKay seam would be lost from use if the decision were made not to mine at the time the Rosebud was being removed.

C. PALEONTOLOGY

Fossils may be destroyed during the mining process. However, surface disturbance may unearth fossils that could be collected and studies made of specimens that would have otherwise remained buried.

D. SOILS AND RECLAIMABILITY

The proposed action would have a significant impact on the soil in the tract (See Table 7-1). By the end of mine life, 4,841 surface acres would be disturbed, in addition to 120 surface acres used for out-of-pit haul roads.

Soil impacts include: displacement of soil from wind and water erosion, change in soil structure and natural fertility, soil compaction from haul roads, and significant problems in revegetation and stabilization on steep slopes.

In the tract, there is a low potential displacement of soil by wind erosion of 52 percent and a high potential displacement of soil by water erosion of 78 percent. (See Table 7-1.) Proper seeding of the stockpiles will reduce this.

Disturbances of the soil would result in alterations of soil structure and porosity. This alteration would affect permeability, infiltration rates, soil-air and soil-water relationships and bulk density. The natural fertility would be affected by disruption of the nutrient cycle and a decrease in organic matter content within the soil. Salinity content would increase as a result of the lower calcareous horizons being brought to the surface.

The soil reconstruction potential is derived from the National Soils Handbook (USDA). The soil hazard conditions determine the reconstruction potential. The tract is rated as 20 percent good and 80 percent poor for reconstruction. Suitability of the soil material for plant growth is rated as 24 percent good, 16 percent fair, 52 percent poor and eight percent unsuitable. (See Table 7-1.) The

soils rated poor can be reclaimed, but would require more intensive and costly management to be revegetated and stabilized. Reclamation efforts made by Western Energy in the Colstrip area have been good, producing an excess of 1,800 pounds of vegetation per acre, three years after reseeding. Costs of this reclamation exceeded $12,000 per acre, but thus far has proved satisfactory. See discussion of Short-Term versus Long-Term Impacts following.

E. WATER RESOURCES

1. Ground Water

Only two undeveloped springs would be affected outside the tract during mining. Flow into the pit during mining would be lowest among the area tracts, about 135 cu ft/day (Van Voast et al 1977). Two wells would need to be redrilled to a deeper depth, if needed, after mining. Following mining, water quality at the depth of the Rosebud coal seam and above in the vicinity of the mine would be degraded by increased salinity. The effect would be significant and long-term. However, water would still be usable for stock.

2. Surface Water

The effects of coal strip mining on surface water would be minor. No mining would be done near enough to East Fork Armell's Creek to affect it directly. Sediment yields can be considered to be proportional to soil erosion losses discussed in the soils section.

3. Alluvial Valley Floors and Flood Plains

No impact on the alluvium of East Fork Armell's Creek would occur from mining the tract.

F. VEGETATION

If the range is in excellent condition (100-76%) there would be an approximate loss of 1,479 to 1,037 AUMs. However, in its present condition, there would be a loss of approximately 932 AUMs.

Reestablishment of native vegetative communities depend upon climatic conditions, species diversity and reclamation technique. In 1984, there would be 161 acres disturbed by mining and every year thereafter another 161 acres would be disturbed for each year of the mine life. By the year 2020, total vegetation should have been reestablished.

The reclamation process for the initial cut would probably be delayed for 2-3 years dependent upon the mining operation. When the mining operation gets into a cut-and-fill situation then the reclamation process would start. Provided there is adequate vegetation present on the reclaimed land, grazing would start after the sixth or seventh year on the initial 161-acre cut and approximately in the fifth year after the mining process becomes a cut-and-fill operation. As mining proceeds in different areas of the tract, not all

of the land is utilized for mining at any one time and grazing could occur on portions of the tract.

Mining of the area would temporarily eliminate opportunities for domestic livestock to occupy the surface and to utilize the forage. However, vegetative production may be better after mining (due to extensive reclamation work) and the area may produce more than the current number of AUMs per acre. There is, however, no evidence that the plant community that ultimately evolved would support higher levels of livestock grazing than the premining vegetation supported.

Additional impacts resulting from vegetation disturbances would be (a) possible reduction of the visual aesthetics, (b) increased soil erosion and (c) reduction in the amount of wildlife and livestock forage.

The Office of Surface Mining assures that the mining company establishes a diverse, effective and permanent vegetative cover to standards set by the Montana Department of State Lands and the federal Bureau of Land Management.

G. LAND RESOURCES

1. Agriculture

The proposed action would have a significant impact on agriculture in the tract (see Table 7-2). There are 4,841 acres to be considered, of which 3,460 acres would be disturbed, in addition to 120 surface acres used for haul roads.

Impacts on agriculture include displacement of 174 acres of class III and IV privately-owned land that would produce, on the average, 166 tons of alfalfa and 166 AUMs or 5,416 bushels of wheat per year.

a. Economic Impacts on Agriculture

Direct Impacts (see the Regional paper - "Agricultural Economics and Agricultural Impacts" for the classification of impacts.)

A loss of approximately $2,640 (all values in 1977 dollars) of ranch output and of about $625 of secondary income was estimated due to on-site disruption of peak disturbance[1/]. No added losses from urbanization are expected as no "new" population impacts would result from mining this EMU. Information on the degree to which

1/ To correctly state income losses, ranch budget simulation analytical models and an inter-industry model would be needed. As these analytical tools were not available in time to do the site specific analyses, the values used are estimated from secondary data. Any bias in the analysis was uniform (consistent error) and should not affect inter-tract comparisons. Bureau of Land Management agricultural specialists are attempting to secure access to more sophisticated analytical tools for future analyses of agricultural impacts.

TABLE 7-2

Colstrip (Area I)

Surface Ownership	Percent of Area	Acres	Land Capability Class 1/ Non-Irrigated	Land Capability Class 1/ Irrigated	Use of land 2/	Predicted Average Yields (Acres x Ave. Yield/Acre) = 2/ Wheat Dry land (Bu)	Wheat Irrigated (Bu)	Barley Dry land (Bu)	Barley Irrigated (Bu)	Oats Dry land (Bu)	Oats Irrigated (Bu)	Alfalfa Dry land (Ton)	Alfalfa Irrigated (Ton)	Tame Hay Dry land (Ton)	Tame Hay	Pas. Type Dry land (AUM)	Pas. Type Irrigated (AUM)
Private	3.14	152	III	–	Cropland	4864	–	7040	–	–	–	152.0	–	142.0	–	152.0	–
Private	0.45	22	IV	–	Cropland	552	–	750	–	–	–	14.4	–	12.9	–	14.4	–
Total	3.59	174			Cropland	5416	–	7790	–	–	–	166.4		154.9	–	166.4	–
Private	4.11	199	IV	–	Reclaimed land	–	–	–	–	–	–	–	–	–	–	138.3	–
Private	3.66	177	III	–	Not Presently Cropped	5614	–	8105	–	–	–	177.0	–	161.9	–	177.0	–
Private	0.06	3	III e-8 VI 3-8	–	Not Presently Cropped	55	–	78	–	–	–	1.8	–	1.4	–	1.8	–
Private	19.40	939	IV	–	Not Presently Cropped	24831	–	33745	–	–	–	711.6	–	590.7	–	711.6	–
	23.12	1119			Not Presently Cropped	30550	–	41928	–	–	–	896.4	–	754.0	–	896.4	
Rosebud County, Montana	0.52	25	IV	–	Reclaimed land	–	–	–	–	–	–	–	–	–	–	17.5	–
Rosebud County, Montana	0.02	1	III	–	Not Presently Cropped	32	–	45	–	–	–	1.0	–	1.0	–	1.0	–
Rosebud County, Montana	5.52	267	IV	–	Not Presently Cropped	7476	–	10680	–	–	–	267.0	–	214.4	–	267.0	–
	5.54	268			Not Presently Cropped	7508	–	10725	–	–	–	268.0	–	215.4	–	268.0	

1/ Soil Capability classification is derived from the unpublished Rosebud County Soil Survey Report, issued June 1977.

2/ Cropland, Land Suitable for cropland and Average predicted crop yield derived from the unpublished Rosebud County Soil Survey Report, and data from Agricultural Stabilization and conservation Service, Rosebud County.

ranchers would be compensated for these losses is not available. It is known, however, that many ranchers value their lifestyle so highly that no compensation would be seen as adequate (Bradley 1979, Bennett 1980).

Indirect Impacts (Interactive Effects)
Physical scientists on the site specific analysis team predicted no losses in off-site agricultural production due to changes in water quality or quantity. Since there are no estimates of changes in off-site productivity, no significant economic impacts other than those previously shown are expected to occur.

b. Rancher Perspectives on Economic and Social Impacts

The two landowners in the Colstrip Area D EMU were contacted. The largest landowner has 13% of the land in the EMU. The smallest landowner has 7% of the EMU acreages. Both of the landowners felt they would suffer a net economic hardship from use of the tract to mining. Both of the landowners also felt they would suffer a lowering of their level of quality of life. Both of the ranchers are opposed to mine development mining.

2. Recreation

No significant long-term impacts are expected to occur on the tract. Some secondary impacts would occur. Overall recreational demand on federal and private lands would increase due to population increases and the construction or relocation of roads at the mine site might improve legal and/or physical access to some areas. These increases would probably reduce levels of recreation enjoyment due to increased crowding, litter, and pollution at and near developed recreation sites.

3. Other Land Uses

Impacts on land use would be relatively minor but highly concentrated. Industrial activities would be introduced into an area of existing actvity with great ability to support additional mining without construction of major facilities or improvement of existing transportation routes. The existing ranching and wildlife uses of the tract would be displaced for the life of the mine but would again be possible after reclamation. The mine would disturb 2,213 acres plus additional offsite acreages for road construction. Assuming a respective right-of-way width of 100 feet, the additional disturbed area would total 33 acres for relocation of 2.74 miles of the county roads.

Changes in the land from these mine-related uses would be mostly temporary and insignificant after reclamation.

The existing road system would have to be upgraded with roads to the site. Problems associated with this include increased trespass, vandalism, litter, and fire hazard potentials. Increased road and rail traffic also increases the potential for more accidents because of greater exposure. The impacts would cease at the end of mining if unnecessary transportation corridors are abandoned and reclaimed; however, this type of land use commonly remains longer than the activity it serves.

H. WILDLIFE

The impacts upon wildlife habitats and populations are summarized in the matrix (Appendix). Impacts are rated for the projected 30-year life span of the mine.

One sharp-tailed grouse arena along with the surrounding nesting habitat would be lost in mining. Since the area-wide population of sharp-tailed grouse appears to be stable or increasing and similar habitat exists on adjacent areas, the impacts on the grouse population would probably be minimal.

Mining would probably disturb the hunting territory of the prairie falcons nesting on Eagle Rock. The extent of disturbance is not known as the actual hunting territory is not known at this time.

Habitat lost to mining would displace up to 14 mule deer from traditional use areas.

Habitat for non-game birds, mammals, and reptiles would be lost during mining. No estimate of numbers displaced is known, but it is felt it would be a low impact, based on the availability of similar adjacent habitat.

I. CULTURAL RESOURCES

All cultural resources within the tract boundaries will be subject to direct impact from construction of haul roads and mining activities, resulting in damage and destruction of sites, artifacts, their immediate environmental context, and the data these contain. Sites not immediately impacted will receive indirect impacts from increased access, erosion, and vandalism. Cultural resources buried by colluvial and alluvial deposition and not recognized in surface inventory would also be destroyed.

Should the tract be leased, a mitigation program would be developed for all affected cultural resources. Implementation of avoidance and preservation alternatives is preferred; if these are not feasible, a scientific program of data retrieval will be developed and implemented.

J. VISUAL RESOURCE MANAGEMENT

Mining would completely change the character of the tract. Visual impacts would increase in the form of land disturbances due to the mines, roads, railroads and utilities. Also changes to the topography, vegetation and scenic quality would occur. There are existing industrial influences in the area, so the contrast would not be extreme. Along with this, some additional decrease in visibility would occur from dust and vehicle emissions. Overall, adverse impacts would be relatively insignificant during mining because of existing influences from area mines. Scenic quality is not expected to be significantly altered after reclamation. There is some above average, "class B" scenery which would be affected, but due to the location, most of these visual impacts would be experienced only by persons visiting the mine. However, some impacts would be visible from State Highway 315. Generally, the visual impacts would be about the same as those of other mines in the region. All of the impacts would either cease or be reduced to very low levels when mining ends and reclamation is completed.

K. ECONOMICS

If Western Energy obtains the lease, then no significant economic impacts would occur from leasing uncommitted federal coal resources in Colstrip Area D other than continuing the same level of mine employment that is occurring on other mine sites in the area.

L. SOCIOLOGY

1. Population

Because there will be no additional employment and population immigration, there will be no impacts from mining in Colstrip Area D over and above what is already occurring with construction of Colstrip 3 and 4 power units.

2. Community Services

See the previous discussion on population.

3. Attitudes

The impacts of development on social attitudes cannot be assessed until after development has occurred. There is no way to estimate what changes, if any, in attitudes would occur.

M. NOISE

The present noises would increase slightly from industrial origins as heavy mining equipment, road traffic, and explosives use are increased from present levels.

N. CLIMATE AND AIR QUALITY

Continuation of surface mining of Area D would result in loading basically the same levels of fugitive dust to the air as is being experienced in this area during current mining. The air quality of the study area is generally excellent except for local fugitive dust and gaseous emissions. Particulate air quality standards in this area have been violated, and approximately a 120-square-mile area in the Colstrip area has been classified as a nonattainment zone for total suspended particulates (TSP). Under law, nonattainment areas may not create new sources of particulates and measures must be taken to control present dust-emitting sources. The Northern Cheyenne Indian Reservation is approximately six miles south of the proposed leasing area. This Reservation has a Class I air quality designation which will have a very large influence on the coal leasing proposal.

IV. SHORT-TERM VERSUS LONG-TERM IMPACTS

A. SHORT TERM

Production through life of mine is estimated at 98 million tons of coal. Most of the resource would be exported, however, some may be used for power generation. The tract would be temporarily committed to a single use that would in turn impact other potential uses.

Short-term impacts of mining on wildlife would be the loss of four sharp-tailed grouse arenas and the surrounding nesting habitat. Up to 34 mule deer and 50 antelope would be displaced during mining. One pair of nesting falcons and one pair of nesting golden eagles would be disturbed during the life of the mine. Habitat for non-game birds, mammals and reptiles would also be lost in the short term.

B. LONG TERM

Evidence of mining and reclamation would remain in the form of less contrasting topography and an alteration of soil texture and porosity.

Long-term imapcts on wildlife would be dependent on the success of reclamation. If shrubs and ponderosa pine cover cannot be restored, the vegetative diversity of the area would be decreased along with an attendant decrease in the variety of birds and animals that use the existent vegetative types.

V. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCE

The coal removed by mining and that left by current recoverable techniques would be lost from future use.

VI. NET ENERGY ANALYSIS

A net energy analysis was calculated using the guidance contained in BLM Washington Office Information Memo 79-282, August 1979. Approximately 38 British thermal units (BTUs) would be expended to produce a pound of coal. That pound of coal, in turn, would produce about 8,462 BTUs. The ratio of energy produced to that expended is over 225 BTUs/1 BTU.

The net energy relationship (ratio of energy produced to energy consumed) for the Colstrip "D" EMU is 339 to 1.[1]

1 Based on the Btu value per pound of coal as given in the tract delineation reports and on an average input energy value of 25.6 Btu's of energy consumed for each pound of coal produced (average of the energy consumption of the Decker mines as described by USGS in a 1977 EIS and the WECO area B expansion as described by the Montana Department of State Lands in a 1978 EIS). Only direct energy consumption was considered (the ratios shown do not contain any estimate of energy used in transporting the coal from the mine to the demand center).

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT	DATA RELIABILITY	COMMENTS
Soils	There are 29 soil series in the tract mapped at level two in a survey done by the Soil Conservation Service which are found along narrow ridges, gently sloping hillsides and wide, shallow valleys.	There will be displacement of soil by water and wind erosional forces; change in soil structure and natural fertility and significant problems in revegetation and stabilization on steeper slopes.	Significance of the impact will be high. Reconstruction potential is rated as 80% poor and suitability of soil material for reclamability is rated as 52% poor and 8% unsuitable.	Data reliability is 80% from the Rosebud County Soil Series Descriptions and interpretations. Better soils in the bottomlands are more accurately mapped than those on the rangelands and steep-sided slopes.	
Water Resources Ground Water Use in Tract	1 stock well and 1 domestic well are in use in the Tract.	Both wells would need to be redrilled with domestic one drilled deeper if needed following mining.	Minimal cost for mining company to redrill well	Good	
Quantity	Coal seam is dry or only partially saturated in the Tract. The natural ground water flow is estimated at 125 cu ft/day and is generally toward the south.	Water would flow into the mine pit at the given rate. Only 2 undeveloped springs would be affected outside the Tract during mining.	Lowest flow rates of Colstrip tracts.	Good	
Quality	Quality for tract in unknown, but medium TDS cone for Colstrip area is 1,700 mg/L.	Some increases in salinity of wells in the vicinity of the mine in and above Rosebud coal seam after mining. Water would still be usable for stock.	Significant and long term.	Good	More research is needed to predict quantitative changes in post-mining quality.

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT	DATA RELIABILITY	COMMENTS
Surface Water Quantity	No major creeks flow through the tract.	Very slight reduction of surface runoff during mining. Possible slight effect after mining.	Very minor.	Good	
Quality	No major creeks. Sediment yields are estimated at 0.5 ac ft/sq mi/year.	Sediment yields should be proportional to soil erosion losses.	Very minor.	Good	
Alluvial Valley Floors and Flood Plains	None.	None.	None.	Good	
Agriculture	There are 174 acres of Class III and IV land in the tract that are presently being cropped.	There will be displacement of lands currently being cropped and suitable for cropland.	It will reduce the alfalfa hay production by 166 tons or 5,416 bushels of winter wheat per year for at least five years.	Data reliability is 80% from the Rosebud County Area Soil Survey.	
Vegetation Rangeland types	EMU Acres Grassland 1965 Sagebrush-grassland 146 Ponderosa pine 2332 Other land 398 4841	Acres being Disturbed Grassland 1965 High Sagebrush-grassland 146 High Ponderosa pine 2332 High Other land 398 Low 4841	High - - - - Long-term elimination of the natural vegetation mosaic and species diversity.	Good	Reclamation of Ponderosa pine not yet proven.
Animal Unit Month (SVIM)	932 AUMs	High	Loss of 932 AUMs - High	Good	
Animal Unit Month If Range is in excellent condition 100-76%				Good	100% 76% 1479 AUMs - 1037 AUMs

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT	DATA RELIABILITY	COMMENTS
Threatened, Endangered or Noxious Species	There are no threatened or endnagered plant species found growing in the EMU. However, there are six noxious species found growing in the Powder River Resource Area, but it has not been determined if these species are found growing in the EMU. The species are: A. Conuolulus arvensis B. Cirsium arvense C. Euphorbia esula D. Centaurea repens E. Cardaria draba F. Centaurea maculosa	Low	Low	Good May 16, 1980 Regional Director Region 6 U.S. FWS Denver, Colorado	
Reclamation-Vegetation	On Federal, State and Private lands, the Office of Surface Mining (OSM) assures that the mining company establishes a diverse effective and permanent vegetative cover to standards set by the Department of State lands of Montana and the Federal Bureau of Land Management.	Low	High - failure of Reclamation Low - success of Reclamation	Good	

ELEMENT	PRESENT SITUATION		ANTICIPATED EFFECT OF LEASING/DEVELOPMENT		SIGNIFICANCE OF ANTICIPATED IMPACT	DATA RELIABILITY	COMMENTS
Wildlife Habitat	Acres	% of Total	Acres Disturbed*	Year 2026			
Grassland	1965	40	1965	Low negative	Low negative	Good	
Sagebrush-grassland	146	3	146	Moderate negative	Moderate negative	Good	
Ponderosa pine	2332	48	2332	High negative	High negative	Good	Reclamation of ponderosa pine not yet proven.
Agricultural lands	398	8	398	Low negative	Low negative	Good	
Populations	Level of Use						
Mule deer	Average		Low negative		Low negative	Good	Reclamation will minimize impacts.
Antelope	None		N/A		N/A		
Sharp-tailed grouse	Average		Low negative		Low negative	Good	
Golden eagle	Low		No change		No change	Good	
Prairie Falcon	Average		Moderate negative		Low negative	Good	
Other Raptors	Average		Low negative		Low negative	Good	
Non-game birds & mammals	Average		Low negative		Low negative	Good	
State species of special interest or concern	Low		Low negative		Low negative	Good	
Threatened or Endangered	None occur		-----		-----		

* Based on estimate of mining sequence

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT	DATA RELIABILITY	COMMENTS
Cultural/Historical Values	84% of tract, 72 percent of surface over federal coal inventories at reconnaissance intensity (100 acres ± per person/day) in 3 surveys. 32 prehistoric, 2 historic sites recorded. 0 sites determined eligible for National Register to date. Projected site density at 99% confidence is 4.88 ± 2.33 sites per square mile. 10% probability of locating additional N.R. eligible sites. 38% of known sites on ridge tops, 29% on spurs, 29% on ridges, 4% on stream terraces.	Direct impact to all cultural resources within tract boundaries.	Damage and destruction of sites, artifacts, environmental context, and data these contain. Reduction of present finite, non-renewable resource base, a long-term loss. Mitigation, while providing as short-term benefit of information gained about prehistory and history, constitutes an irretrievable, irreversible commitment of the resource.	Poor. 1974 survey conducted at reconnaissance level (ca. 107 acres/person/day) (Fredlund 1980b, p. 50). 1977 survey conducted for standing structures, rock art and large prehistoric sites only (Fredlund, pers. comm. 1980). 1976 survey makes one statement as to intensity of survey coverage (Lahren 1977). Due to the relatively low intensity of survey coverage, site density estimate for Colstrip Area D may be low.	

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT	DATA RELIABILITY	COMMENTS
Recreation	No development or known use of the area. Very limited use may occur. Hunting by permission of landowner. No public access exists.	None. No recreation functions are planned for the area and legal access does not exist.	Virtually none on the short term. No effect on a long term basis.	Poor.	Recreation data is virtually non-existent.
Wilderness	No wilderness potential within or near area.	None.	None.	Excellent.	Wilderness inventory complete and area elimnated from consideration.
VRM	Strip-mining occurring nearby. Scenic quality fairly low and dominated by existing mines. Scenic quality classes B and C, with roughly equal amounts of each.	Disturbance of landforms and natural scene. Impacts cumulative with area mines. Some activities visible from State Highway 315.	Moderate during mine life. Low after reclamation.	High.	Very difficult to mitigate impacts while mining is occurring.
Noise Air Quality	Noises and odors from artificial origins due to mining activities now occurring in area.	Noises and odors would increse slightly from present levels of industrial influence.	Quite severe during mining. Impact would cease when mine is closed.	Excellent.	Impossible to mitigate during mine life.

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT	DATA RELIABILITY	COMMENTS
Transportation:					
Employee	Roads to area adequate. Site access by gravel road.	Increased traffic on State Highway 315. Potential for more accidents.	Moderate on all accounts during mining. Very low after mines close.	Good.	Road improvements should contribute to safety after mining traffic ceases.
Product	Roads adequate for transport. Rail service exists to operating mines and only a short spur is needed to connect with line.	Increased traffic hazards. Increased surface disturbance.	Moderate. Low.	Good for all items.	
Land Use	Tract used for ranching. Strip-mining occurs nearby.	Expansion of industrial activities. Land removed from existing uses.	Moderate during mining. Low to none after reclamation.	Good.	

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